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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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*Ex parte* MICHAEL CHARLES GRADY

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Appeal 2008-6266  
Application 10/617,270  
Technology Center 1700

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Decided: January 27, 2009

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Before CHUNG K. PAK, PETER F. KRATZ, and JEFFREY T. SMITH,  
*Administrative Patent Judges.*

KRATZ, *Administrative Patent Judge.*

**DECISION ON APPEAL**

This is a decision on an appeal under 35 U.S.C. § 134 from the Examiner's final rejection of claims 1-46. We have jurisdiction pursuant to 35 U.S.C. § 6.

Appellant's claimed invention is directed to polymer production process and products made therewith. Claims 1 and 30 are both illustrative and reproduced here, as follows:

1. A process for producing a polymer comprising:

conveying hybrid reactor mixtures comprising one or more hybrid reactor monomers and one or more hybrid reactor initiators to one or more hybrid reactors maintained at effective hybrid polymerization temperatures and sub-reflux polymerization gage pressures to cause polymerization of a portion of said hybrid reactor monomers into said polymer, and

conveying hybrid reactor contents to one or more batch reactors maintained at effective batch polymerization temperatures and reflux polymerization pressures to cause polymerization of a remaining portion of said hybrid reactor monomers into said polymer.

30. A polymer made by the process of claim 1 or 29.

The Examiner relies on the following prior art reference as evidence in rejecting the appealed claims:

Prentice	5,171,768	Dec. 15, 1992
Berge	5,362,826	Nov. 08, 1994

The Examiner maintains the following rejections:

Claims 1-3, 5-12, 16-22, 24-33, and 36-46 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Prentice. Claims 1-46 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Berge in view of Prentice.

At the outset, we note that Appellant argues several process conditions as distinctions in traversing the Examiner's anticipatory rejection of claims 1-3, 5-12, 16-22, 24-33, and 36-46 together as a group in the

Appeal Brief (App. Br. 4-12; Reply Br. 2-3).<sup>1</sup> Similarly, Appellant opposes the Examiner's obviousness rejection of claims 1-46 by asserting several common arguments as to all of the so rejected claims based on alleged process differences (App. Br. 12-16; Reply Br. 3-4). However, how the process-based arguments may serve to patentably distinguish product-by-process claims 30 and 31 from the anticipatorily applied disclosure of Prentice and/or show error in the Examiner's obviousness rejection of the product claims over the collective teachings of Berge and Prentice presents somewhat different questions from how these arguments may fair in overcoming the Examiner's rejections as to the process claims.

For example, all of the rejected method claims require at least two polymerization steps (see representative claim 1 and the other independent process claims 32, 33, and 46). Each of these rejected claims, as represented by claim 1, require a polymerization process including a polymerization step taking place in a reactor under sub-reflux pressure conditions followed by further polymerization in at least one other reactor under reflux pressure conditions. The "sub-reflux" polymerization occurs in one or more reactors called "hybrid" reactor(s) and the other "reflux" polymerization occurs in one or more batch reactors (see representative claim 1). Of course, the product-by-process claims 30 and 31 are measured by the required product. This distinction is more fully developed below.

Accordingly, we group and treat rejected product claims 30 and 31 separate from the remaining rejected claims that are subject to each of the

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<sup>1</sup> Our references to the Appeal Brief and to the Reply Brief are to the Briefs filed subsequent to the Panel Remand dated August 28, 2007. Similarly, our references to the Examiner's Answer herein are to the Answer dated December 28, 2007.

Examiner's rejections. We select claim 30 as being a representative claim on which we shall decide this Appeal as to the separately considered and regrouped product claims subject to each stated rejection.

We select claim 1, which claim is common to both of the Examiner's rejections, as a representative independent claim on which we shall primarily focus in deciding this appeal as to the method claims that are subject to each stated rejection.

We affirm both stated rejections as to product claims 30 and 31. However, we reverse both rejections as to the involved method claims. Our reasoning follows.

#### ISSUES

1. Has Appellant shown that the Examiner reversibly erred in finding that Prentice inherently describes a polymerization process including a "sub-reflux condition" in a first polymerization reactor stage and a "reflux condition" in a second polymerization reactor stage corresponding to the polymerization process required by method claims 1-3, 5-12, 16-22, 24-29, 32, 33, and 36-46; and in finding that Prentice anticipates, *prima facie*, these claims?
2. Has Appellant shown that the Examiner reversibly erred in combining Prentice with Berge to allegedly show that the combined teachings thereof would have rendered a multi-stage polymerization process required by the rejected method claims 1-29 and 32-46 *prima facie* obvious?
3. Has Appellant established reversible error in the Examiner's anticipation and/or obviousness rejections of product claims 30 and 31 by presenting arguments with respect to alleged polymerization process differences without focusing on and substantiating how any process

difference(s) that may be actually recited in the preparation of the product, in product-by-process claims 30 and/or 31, would necessarily result in a patentable difference of the claimed product over products prepared according to the applied prior art?

#### SUMMARY DISPOSITION

We answer issue questions 1 and 2 in the affirmative and issue question 3 in the negative. Thus, we reverse the Examiner's rejections as to the process claims subject to each rejection and we affirm both of the Examiner's rejections as to the product claims.

#### PRINCIPLES OF LAW

During examination, claims terms must be given "their broadest reasonable construction consistent with the specification." *In re Icon Health and Fitness, Inc.*, 496 F.3d 1374, 1378-79 (Fed. Cir. 2007). In this regard and in proceedings before the Patent and Trademark Office (PTO), claims in an application are not only given their "broadest reasonable interpretation consistent with the specification" but also the claim language is "read in light of the specification as it would be interpreted by one of ordinary skill in the art". *In re Sneed*, 710 F.2d 1544, 1548 (Fed. Cir. 1983).

A reference is anticipatory within the meaning of § 102 if it discloses each and every claim limitation either expressly or inherently. *In re Schreiber*, 128 F.3d 1473, 1477 (Fed. Cir. 1997).

As stated in *In re Oelrich*, 666 F.2d 578, 581 (CCPA 1981) (quoting *Hansgirg v. Kemmer*, 102 F.2d 212, 214 (CCPA 1939)) (internal citations omitted), "Inherency, however, may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient."

Of course, the burden of establishing a *prima facie* case of anticipation or obviousness resides with the PTO. *See In re Piasecki*, 745 F.2d 1468, 1472 (Fed. Cir. 1984).

However, in assessing the patentability of a product-by-process claim, the product made is the focus of our inquiry. In this regard, the patentability of a product is a separate consideration from that of the process by which it is made. *See In re Thorpe*, 777 F.2d 695, 697 (Fed. Cir. 1985); *In re Brown*, 459 F.2d 531, 535 (CCPA 1972). It is well settled that when prior art discloses a product which reasonably appears to be either identical with or only slightly different than a product claimed in a product-by-process claim, the burden is on the Applicant to establish with objective evidence that the products are not, in fact, substantially the same. *In re Brown*, 459 F.2d at 535.

“[A]nalysis [of whether the subject matter of a claim is obvious] need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ.” *KSR Int’l Co. Teleflex, Inc.*, 127 S. Ct. 1727, 1741 (2007). The analysis supporting obviousness, however, should be made explicit and should “identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements” in the manner claimed. *Id.*

#### FINDINGS OF FACT

The following findings of fact are supported by a preponderance of the evidence. Additional findings of fact, as necessary, may appear in other portions of this opinion.

The Specification provides that:

"Sub-reflux conditions" mean reactor conditions, such as pressure and temperature at which no boiling of solvents or monomers present in the polymerization medium occurs.

"Reflux conditions" mean reactor conditions, such as pressure and temperature at which boiling of solvents or monomers present [in the] polymerization medium occurs.

Spec. 6.

Prentice discloses a free radical emulsion polymerization method for producing carboxylated latex products (Abstract). The method includes a pre-polymerization step involving a non-carboxylic co-monomer and unsaturated carboxylic acid monomer in the absence of any conjugated diene to a conversion of 3-12% forming partially polymerized latex (col. 1, ll. 35-54). A conjugated diene is co-polymerized with the pre-polymer (*id.*) Prentice discloses that using such selective addition of conjugated diene monomer reduces non-desirable 4-phenylcyclohexene (4-PCH) formation associated with prior art multi-reaction zone polymerization of carboxylated latex (col. 1, ll. 7-31 and 55-62). Prentice describes using two or more reaction zones, including batch or stirred tank reactors, in a batch, semi-continuous, or continuous process (col. 5, l. 11- col. 6, l. 41).

Prentice discloses the use of initiators typically employed in free radical polymerization (col. 4, l. 62- col. 5, l. 10).

Prentice discloses preferable constant reaction pressures of 130-210 psig and reaction temperatures of 65-85 degrees Centigrade for a first reaction zone and 75- 95 degrees Centigrade for the second, third, and fourth reaction zones (col. 5, ll. 22-29). Prentice discloses lower reaction

temperatures of 60-75 degrees Centigrade are usable with longer reaction times (col. 5, ll. 36-38).

Prentice discloses that the product latex formed from their process has unique film forming properties (Abstract; col. 9, ll. 19-40).

Berge discloses a method of preparation of compositions including macro-monomers of limited molecular weight, including olefinic polymerizable end groups (Abstract; col. 2, ll. 42-55). Berge notes that the macromonomer products produced by their process can be used to form graft copolymers, microgels, non-aqueous dispersed polymers, branched polymers, block polymers, ladder polymers, and star polymers (col. 4, ll. 11-15). Thus, the resulting product can be used in coatings and other applications (col. 4, ll. 14-32 and col. 7, ll. 42-61).

Berge discloses that the macromonomer production process can be carried out using known polymerization initiators and in the presence of a polymerization medium and in a batch, semi-batch, continuous, or feed process (col. 10, ll. 41 - col. 11, l. 44). Berge teaches the possibility of producing terminally functional macromonomers using oligomeric chain transfer agent in the reaction mixture (col. 11, ll. 62-68). Berge provides that monomer reflux can be avoided during a batch process for producing the macromonomer (col. 10, l. 67 - col. 11, l. 2).

## ANALYSIS

### REJECTED PROCESS CLAIMS

#### Anticipation Rejection

In the anticipation rejection of method claims 1-3, 5-12, 16-22, 24-29, 32, 33, and 36-46 over Prentice, the Examiner recognizes that Prentice does

not explicitly describe “sub-reflux” (non-boiling) and “reflux” (boiling) pressure reaction conditions for separate polymerization reactors used in the described polymerization process thereof, as required by all of Appellant’s rejected process claims. This is evidenced by the Examiner’s inherency position regarding the representative claim 1 requirement for a process using a “sub-reflux” pressure reaction condition in a first polymerization reactor (hybrid reactor) and a “reflux” pressure reaction condition in another polymerization reactor (batch reactor) as set forth in the Answer (Ans. 8).

However, as argued by Appellant (App. Br. 6, 7, and 10-12), the Examiner has *not* reasonably established by a preponderance of the evidence that Prentice inherently describes “sub-reflux” (non-boiling) and “reflux” (boiling) pressure reaction conditions for separate polymerization reactors used in the disclosed polymerization process. While the Examiner asserts that Prentice “discloses the same at least two steps polymerization, the same polymerization conditions, the same reactor, and high rate monomer conversion”, the Examiner seemingly bases this position on the notion that “[t]he term ‘sub-reflux condition’ and ‘reflux’ condition could be the same condition being as an atmospheric pressure, if compare process conditions in the present claim 22 and claim 11” (Ans. 8).<sup>2</sup>

The Examiner’s inherency position is untenable. Appellant’s Specification defines the terms “sub-reflux condition” and reflux condition” as being non-boiling and boiling conditions, respectively (Spec. 6). In this regard, the claim term “sub-reflux” would have reasonably conveyed to one of ordinary skill in the art that representative claim 1 calls for a pressure

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<sup>2</sup> Also, the Examiner further attempts to explain this point on page 12 of the Examiner’s Answer.

chosen such that no boiling of monomers or solvents present would occur in the hybrid reactor(s) operated with a sub-reflux pressure; that is, a pressure correlated with the other involved reactor conditions such that boiling is prevented. Also, the claim term “reflux” associated with the pressure reaction parameter of the batch polymerization reactor(s) of representative claim 1 would have reasonably conveyed to one of ordinary skill in the art that the pressure chosen was such that some boiling of monomers or solvents present would occur in the reactor(s) operated with reflux pressure; that is, a pressure correlated with the other reactor conditions such that boiling takes place.

Here, the Examiner has not presented a reasoned basis to establish that Prentice necessarily employs a selected pressure coupled with the other reaction conditions that permits no boiling to occur in a first pre-polymerization reaction zone and a pressure coupled with other reaction conditions that provides for boiling in a subsequent reaction polymerization zone, as required by representative claim 1 and all of the other rejected process claims.

The Examiner’s suggested comparison of Appellants’ dependent claim 11 wherein a sub-reflux polymerization gauge pressure range is given for hybrid reactors that includes, as one endpoint, a zero gauge pressure with an atmospheric pressure for batch reactors set forth in dependent claim 22 is again noted. However, this suggested comparison does not explain how Prentice inherently describes a first reaction stage operated with selected conditions, including a selected “sub-reflux” pressure (not a range), that results in a non-boiling polymerization *and* a second reaction stage operated

with conditions, including a selected “reflux” pressure, which selected condition requires a boiling polymerization condition.

On this record, the Examiner has not established that Prentice describes (explicitly and/or inherently) all of the process limitations required by representative rejected claim 1 and the other appealed process claims.

#### Obviousness Rejection of Process Claims

As for the Examiner’s obviousness rejection of process claims 1-29 and 32-46, we note that the Examiner relies on Prentice to supplement the teachings of Berge to establish the obviousness of employing a second stage polymerization under reflux conditions. The Examiner maintains that:

It would have been obvious to one of ordinary skill in the art to modify the process of producing macromonomer composition in Berge invention by a continuous polymerization of said macromonomer with addition monomer(s) in the second polymerization stage as disclosed by Prentice because any additional functional monomer is expected by Berge, column 11, lines 65-68, and, thereby, obtain the claimed requirement.

Ans. 10-11

However, as explained by Appellant (App. Br. 12-17), Prentice is directed to the production of carboxylated latexes with a specified pre-polymerization step and staged selected addition of conjugated diene in a multistage process to diminish 4-PCH formation, while Berge is directed to macromonomer production using an oligomeric chain transfer agent. Although Berge does indicate that the macromonomers produced therein can be used for forming blocked, branched, star, non-aqueous dispersion, and/or ladder polymers (col. 12, ll. 40-43), the Examiner has not adequately

explained how these subsequent uses of the macromonomers described by Berge coupled with the teachings of Prentice, respecting a multistage latex production process with staged conjugated diene addition subsequent to a limited pre-polymerization, would have led one of ordinary skill in the art to employ select portions of these disparate teachings of Prentice together with Berge in a manner that would have resulted in the claimed process.

After all, the Examiner has the initial burden of establishing a prima facie case of obviousness. *See In re Piasecki*, 745 F.2d at 1472.

Claims 30 and 31

Anticipation Rejection

Regarding representative product claim 30, the Examiner has found that Prentice discloses a polymer product that can include water as a medium and “has unique film forming characteristics and polymer morphology” including “good tensile value and elongation performance” (Ans. 7; Prentice, Abstract, col. 1, ll. 30-31, 67; col. 9, Table III). Appellant does not dispute these findings of the Examiner. In this regard, we note that representative claim 30 is a product-by-process claim that refers to the process of claim 1 for the methods of preparation thereof. This method of preparation does not specify any particular monomers or initiator ingredient employed. Nor does the method of preparation otherwise limit the components that may be found in the product polymer produced.

Given the above, we determine that that Examiner has tendered a prima facie case of anticipation for the representative product-by-process claim 30 that has not been fairly refuted by Appellants with evidence that establishes that a patentably distinct product is necessarily formed by the

manner in which the product of representative claim 30 is prepared. In this regard, it is appropriate that the burden of coming forward with evidence to establish a product distinction for the claimed product based on the manner of preparation thereof rests with Appellant. *See In re Brown*, 459 F.2d at 535. Here, Appellant has not discharged this burden.

It follows that we shall sustain the Examiner's anticipation rejection of product claims 30 and 31.

#### Obviousness Rejection

We shall likewise sustain the Examiner's obviousness rejection of the product-by-process claims over the combined teachings of Prentice and Berge for the reasons stated above. In this regard, anticipation is the epitome of obviousness. *See In re Pearson*, 494 F.2d 1399, 1402 (CCPA 1974).

In addition, we note that Berge discloses that their product polymers (macromonomers) can be used in forming coatings (col. 4, ll. 14-32 and col. 7, ll. 42-61). Appellant has not specifically articulated how their product (representative claim 30) patentably differs from the polymer products of Berge by coming forward with a substantiated argument and evidence to show that the process of making the product of representative claim 30 would necessarily result in a patentably distinct product over that taught or suggested by Berge with or without Prentice.

On this record, we shall sustain the Examiner's obviousness rejection of claims 30 and 31.

#### CONCLUSION

Appellant has shown that: (1) the Examiner reversibly erred in finding that Prentice inherently describes a polymerization process including a "sub-

reflux condition” in a first polymerization reactor stage and a “reflux condition” in a second polymerization reactor stage corresponding to the polymerization process required by Appellant’s anticipatorily rejected method claims 1-3, 5-12, 16-22, 24-29, 32, 33, and 36-46; (2) the Examiner reversibly erred in combining the disparate process of Prentice with Berge without specifically identifying why one of ordinary skill in the art would have been led to combine select teachings from Prentice with Berge in a way so as to render a multi-stage polymerization process required by the rejected method claims 1-29 and 32-46 *prima facie* obvious.

Appellant has not established reversible error in the Examiner’s anticipation and/or obviousness rejections of product-by-process claims 30 and 31 by arguing alleged polymerization process differences without specifying and substantiating how the process differences recited in product-by-process claims 30 and/or 31 would necessarily result in a patentable product difference for the product covered by these claims over the products of the applied prior art.

#### ORDER

The decision of the Examiner to reject claims 1-3, 5-12, 16-22, 24-29, 32, 33, and 36-46 under 35 U.S.C. § 102(b) as being anticipated by Prentice, and to reject claims 1-29, and 32-46 under 35 U.S.C. § 103(a) as being unpatentable over Berge in view of Prentice is reversed. The decision of the Examiner to reject claims 30 and 31 under 35 U.S.C. § 102(b) as being anticipated by Prentice, and to reject claims 30 and 31 under 35 U.S.C. § 103(a) as being unpatentable over Berge in view of Prentice is affirmed.

Appeal 2008-6266  
Application 10/617,270

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv).

**AFFIRMED-IN-PART**

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